

A NEW BRISTLETAIL SPECIES OF THE GENUS PEDETONTINUS (MICROCORYPHIA, MACHILIDAE) FROM CHINA

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Abstract A new species, *Pedetontinus songi* sp. nov., is described from Mt. Taimu, Fujian Province, China. A key to the species of *Pedetontinus* is provided. Type specimens are deposited in the College of Chemistry and Life Science, Zhejiang Normal University.

Key words Microcoryphia, Machilidae, *Pedetontinus*, new species, China.

1 Introduction

Pedetontinus Silvestri is a genus belonging to Petrobininae of the family Machilidae known from China, Japan and Korea. To date, 11 species have been reported in the world (Choe and Lee, 2001a, b; Mendes, 1990a; Silvestri, 1943; Xue and Yin, 1991; Zhang et al., 2005). On examining the species collected from East China, we came across a new species, which we named as *Pedetontinus songi* sp. nov. In the present paper, we describe and illustrate the new species, *P. songi* sp. nov., from Fujian Province, China and provide a key to the species of the genus *Pedetontinus*.

The specimens studied in the course of this work are deposited in the College of Chemistry and Life Science, Zhejiang Normal University, China. The morphological terminology follows that of Mendes (1990b).

2 Material Examined

Holotype, ZJNUSB001, an adult male; China, Mt. Taimu (27°7'N, 120°11'E), Fuding County, Fujian Province, on fallen pine needles and broad-leaves, at an elevation of 780 m, 25 Aug. 2008, coll. ZHANG Jia-Yong. Paratypes: ZJNUSB002-005, 4 adult males; ZJNUSB006-011, 6 adult females, same data as for holotype. The measurements in the paper are in millimeters (mm).

Pedetontinus songi sp. nov. (Figs. 1-22)

Males. Body length: 7.0-7.5 mm; antennae: 4.5-5.0 mm; terminal filament: 7.5-8.0 mm; cerci: 3.5 mm. Body yellowish-brown, covered densely with scales and with pigments (Fig. 1).

Head (Fig. 2) brown between two antennae. Clypeus covered with numerous short, thin setae. Frons convex moderately, scaled between antennae and ocelli, frons with two long setae and two short setae.

Compound eyes (Oculus) large, flat, ground color of oculus blackish brown, a huge bright yellow on inner upper corner (in living insects), contact line/length (cl/l): 0.72; length/width (l/w): 0.90. Two ocelli

dumbbell-shaped, enlarged in submedian area, reddish brown, width of ocellus slightly narrower than that of compound eye (width of ocellus about 0.75 of that of compound eye) (Fig. 3).

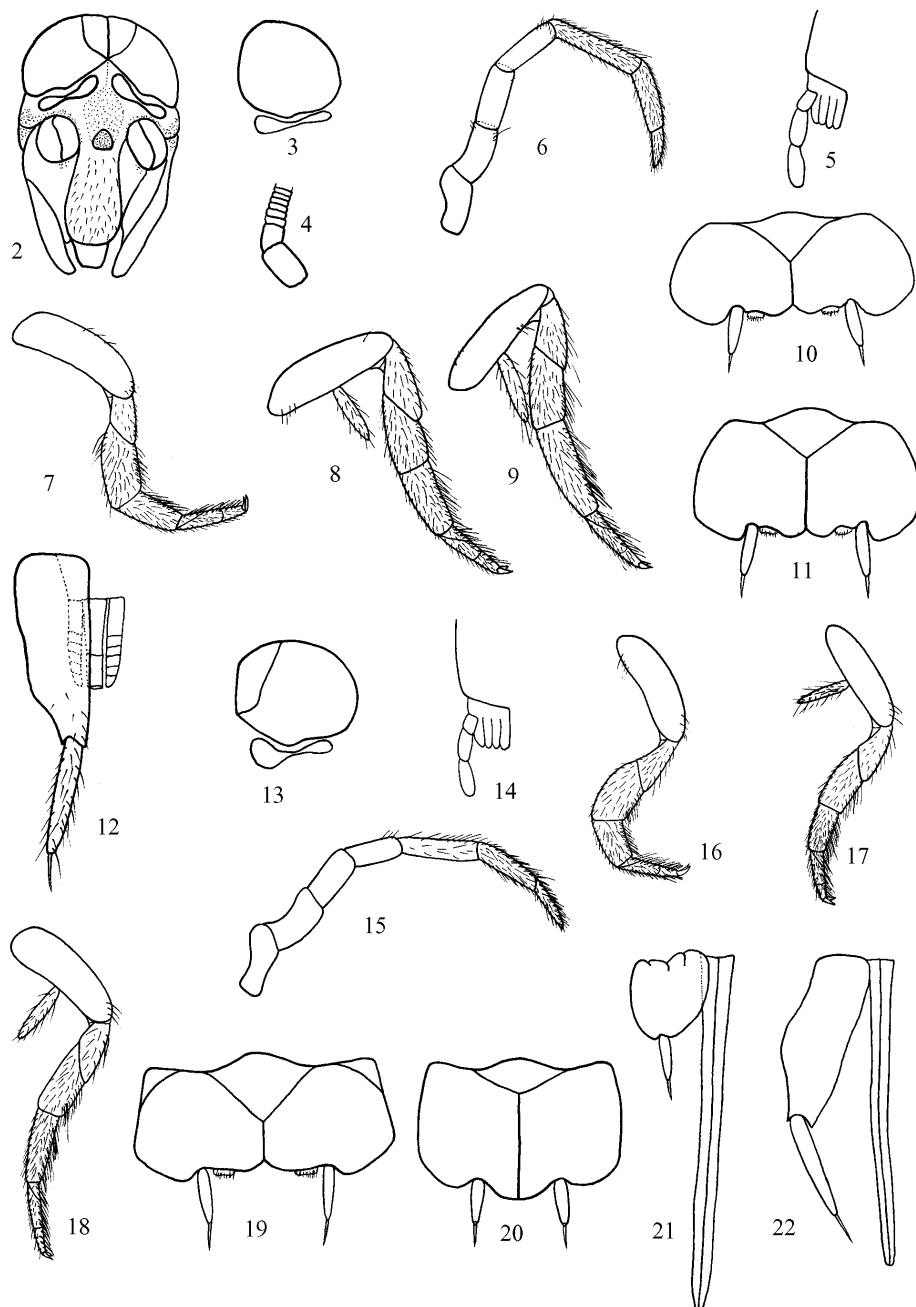
Antennae shorter than body length, antennal length/body length about 0.64-0.66. Scapus and pedicellus of antennae densely scaled; flagellum not scaled. Scapus rather long (length/width about 2.00), pedicellus as long as wide (Fig. 4). Flagellum is uniformly brownish, junctions between segments pale; terminal segment with 7 annuli (length/width of annuli about 2.0), with sensilla and sensorial points.

Labial palp as in Fig. 5, Segment no scale, - sparsely scaled; segment with sensorial cones on apical part.

Mandibles quite robust, provided with four typical apical teeth. Maxillary palp (Fig. 6) with numerous setae of moderate size; those in segments - denser than in segments -. Segments - scaled densely. Segments - provided with numerous short setae. External apophysis of the first segment conical in shape, slightly curved backwards with setae sparsely on ventral surface. Segment is curved inwards, not extending beyond segment and with few dense light short setae on internal distal end. Segment with few short setae on ventral surface and internal distal end. Segment with cone-shaped. Dorsal surface of the segments - with hyaline spines as follows: : 4-6; : 16-118; : 16-18. Ratio of length segment / : 0.47; segment / : 0.67.

Legs - (fore leg, mid leg, hind leg) (Figs. 7-9) and coxal stylets scaled. Legs and with coxal stylets. Femur of leg not swollen, ratio of length to width: 2.0. Length of tibia in leg : 0.50 mm; tibia in leg : 0.50 mm; tibia in leg : 0.60 mm. Legs I stronger than others, tibia of legs not obviously elongated.

Urosternites not pigmented. Abdominal stylet of segments not especially elongated except th segment. Abdominal segments - with a pair of eversible



Figs. 1-22. *Pedetontinus songi* sp. nov. 1-12. Male, 1. Habitus, dorsal view. 2. Head, frontal view. 3. Oculus and ocellus. 4. Part of antenna. 5. Labial palp. 6. Maxillary palp. 7. Fore leg. 8. Mid leg. 9. Hind leg. 10. Urosternite. 11. Urosternite. 12. Urosternite with genital appendages and penis. 13-22. Female. 13. Oculus and ocellus. 14. Labial palp. 15. Maxillary palp. 16. Fore leg. 17. Mid leg. 18. Hind leg. 19. Urosternite. 20. Urosternite. 21. Urosternite with anterior gonapophyses. 22. Urosternite with posterior gonapophyses.

vesicles. Urosternite - as in Figs.10-12. Sternum (Fig.10) with nearly right posterior angled (87°90°); length/basal width of sternum : 0.67. Urosternite (Fig.11) without swollen on its inner posterior part. A penis and a pair of parameres with 1 + 5 articles (or 6 articles) extending backward to 2/3 of length of the th urosternite (Fig.12). Penis normal, slightly longer than paramere, ratio bp/tp : 2.0, opening of penis small and apical. Male genitalia completely covered by the th urosternite. Apical spine of abdominal stylets strong, medium-sized. hind coxites provided with 6-7 spines near apex. Length ratios of stylet (excluding apical spine) to coxite, : 0.50; : 0.50; : 0.77; length ratios of apical spine to stylet, : 0.33; : 0.33; : 0.37.

Terminal filament and cerci without piliform scales, with numerous scales, a few cilia and some strong spine.

Females. Body length: 7.5-8.0 mm; antennae: 4.5-5.0 mm; terminal filament: 8.0-8.3 mm; cerci: 3.5 mm.

Head as in male. More setae present in the labrum and the clypeus. Frons convex moderately, scaled between antennae and ocelli, frons with two long and two short seate.

Compound eyes large, flat, ground color of oculus blackish brown, a huge bright yellow on inner upper corner (in living insects), contact line/length (cl/l): 0.72; length/width (l/w): 0.88-0.90. Two ocelli dumbbell-shaped, enlarged in submedian area, reddish brown, width of ocellus slightly narrower than that of compound eye (width of ocellus about 0.72 of that of compound eye) (Fig.13).

Antennae as in male. Antennal length/body length about 0.40-0.43. Scapus rather long (length/width about 2.00), pedicellus as long as wide. Flagellum is uniformly brownish, junctions between segments pale; terminal segment with 6 annuli (length/width of annuli about 1.0), with sensilla and sensorial points.

Maxillary palp (Fig.15) as in male. Dorsal surface of the segments - with hyaline spines as follows: : 4-6; : 14; : 14-16. Ratio of length segment / : 0.63; segment / : 0.64-0.65.

Labial palp as in male (Fig.14).

Legs (Figs.16-18) as in male. Femur of leg not swollen, ratio of length to width: 2.0. Length of tibia in leg : 0.56-0.58 mm; tibia in leg : 0.54-0.56 mm; tibia in leg : 0.60-0.63 mm. Fore legs stronger than others, the tibia of hind legs elongated.

Abdominal segments as in male. Urosternites not pigmented. Abdominal stylets not elongated. Abdominal segments - with a pair of eversible vesicles. Urosternite - as in Figs.19-22. Sternum with nearly right posterior angled (85°89°); length/basal width of urosternite (Fig.19): 0.66-0.67. Medial part of urosternite (Fig.20) projected and swollen, exceeding posterior margin. Ovipositor of the primary type and slightly exceeding beyond the stylet of urosternite. Gonapophysis (Fig.21) with 44-46 divisions, with sensilla except 3-4 basal divisions. Gonapophysis (Fig.22) with 46 divisions, the basal 22-23 divisions with some short setae. hind coxites provided with 7-8 spines near apex. Length ratios of stylet (excluding apical spine) to coxite, : 0.51; : 0.68; : 0.50; length ratios of apical spine to stylet, : 0.38; : 0.33; : 0.45.

Terminal filament and cerci as in male.

Etymology. The specific name is a patronym in honor of Academician SONG Da-Xiang, a famous Chinese arachnologist.

Remarks. *P. songi* sp. nov. can be separated from all other described species of the genus *Pedetontinus* by the the ratio of length to basal width of urosternite V, and the pattern of black scales. The new species is related to *P. tianmuensis*, *P. yinae*, *P. lineatus*. Their main differences are as Table 1.

Table 1. Comparisons of characters among <i>P. songi</i> sp. nov., <i>P. lineatus</i> , <i>P. tianmuensis</i> and <i>P. yinae</i> .				
	<i>P. songi</i> sp. nov.	<i>P. lineatus</i>	<i>P. tianmuensis</i>	<i>P. yinae</i>
Body length	7-8 mm	8-9 mm	8-10 mm	7-8 mm
Body color	Yellowish brown	Dark	Yellowish gray	Reddish brown
Scales	No black sacs	Black scales on both sides of terga	No black sacs	No black sacs
Oculus	Blackish brown with a huge bright yellow patch	Reddish brown with partly yellowish	Blackish brown with a huge white patch	Blackish brown with a huge white patch
Ocellus	Reddish brown, dumbbell-shaped	Reddish brown, dumbbell-shaped	Reddish brown, shoe-shaped	Brownish black, shoe-shaped
Gonapophyses	44-46 divisions	45-48 divisions	4-53 divisions	41-45 divisions
Paranmera	1 + 5 articles	1 + 5 articles	1 + 6 articles	1 + 6 articles
Contact line/length of oculus (cl/l)	0.72	0.70-0.75	0.60	0.72-0.74
The ratio of length to basal width of urosternite V	About 2/3	About 1/2	About 2/3	About 2/3

Biology. *P. songi* sp. nov. was found in the forest leaf litters. They appear to occur in dry condition. It is not easy to collect this species because the color and line pattern of their scales is cryptic, blended with fallen pine needles and dead broad-leaves.

Key to species of the genus *Pedetontinus*

1. Oculi normal, as wide as long, or longer than wide 2
Oculi wider than long 7
2. Oculi longer than wide, legs with hyaline spines, transparent spiniform seta in legs, Penis shorter than paramere *P. szeptyckii*
Oculi as long as wide 3
3. Boundary line between oculi as long as, or longer than 2/3 of ocular length 4
Boundary line between oculi shorter than 2/3 of ocular length 6
4. Ratio of length to basal width of urosternite V or larger 2/3 a pair of paramere with 1 + 7 articles *P. ishii*
Ratio of length to basal width of urosternite V shorter 2/3 5
5. Ratio of length to basal width of urosternite about 3/8, the terminal segments of flagellum with 6 or 7 annuli *P. dicrocus*
Ratio of length to basal width of urosternite about 1/4, the terminal segments of flagellum with 7 or 8 annuli in female, 9 annuli in male ...
..... *P. kuwanae*
6. Ratio of length to basal width of urosternite about 1/3, the terminal segments of flagellum with 6 or 7 annuli in female, 9 or 10 annuli in male
..... *P. esakii*
Ratio of length to basal width of urosternite about 1/4, the terminal segments of flagellum with 7 or 8 annuli in female, 9 annuli in male ...
..... *P. yosii*
7. Boundary line between oculi as long as, or longer than 2/3 of ocular length 8
Boundary line between oculi slightly shorter than 2/3 of ocular length, about 3/5, the ratio of length to basal width of urosternite larger than 2/3, penis as long as paramere and extending backward to 3/4 of length of the coxite *P. tianmuensis*
8. Boundary line between oculi as long as 2/3 of ocular length, penis slightly longer than paramere and extending backward to 2/3 of length of the coxite *P. aureus*
Boundary line between oculi longer than 2/3 of ocular length 9
9. A pair of paramere with 1 + 6 articles 10

中国跃蚧属 (石蛎目, 石蛎科) 一新种

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摘 要 记述采自福建太姥山跃蚧属 1 新种, *Pedetontinus songi* sp. nov., 并列出跃蚧属已知种的检索表。研究标本保存在浙江师范大学生化学院。

宋氏跃蚧, 新种 *Pedetontinus songi* sp. nov. (图 1~22)

新种与尹氏跃蚧 *Pedetontinus yinae* Zhang et al. 相似, 但在阳基侧突分节上明显区别, 宋氏跃蚧 *P. songi* 阳基侧突为 1 + 5 型, 而尹氏跃蚧 *P. yinae* 为 1 + 6 型。与 *Pedetontinus lineatus* Chose & Lee 相似, 但宋氏跃蚧 *P. songi* 体长 7 ~ 8 cm, 体色棕黄色, 体表无黑色鳞片; 复眼黑棕色, 复眼中缘具浅黄色

关键词 石蛎目, 石蛎科, 跃蚧属, 新种, 中国。

中图分类号 Q969. 121

- A pair of paramere with 1 + 5 articles 11
10. Body length about 11-14 mm, gonapophyses with 51-58 divisions, the color of antenna uniformity *P. rhombeus*
Body length about 7-8 mm, gonapophyses with 41-45 divisions, proximal half of flagellum whitish in color, others uniformity
..... *P. yinae*
 11. The ratio of length to basal width of urosternite shorter 1/2, terga with a pair of prominent median black scales *P. lineatus*
The ratio of length to basal width of urosternite about 2/3, terga without prominent median black scales *P. songi* sp. nov.

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REFERENCES

- Choe, G. H. and Lee, B. S. 2001a. A new species of the genus *Pedetontinus* (Archaeognatha, Machilidae) from Korea. *Korean J. Bio. Sci.*, 5: 113-116.
- Choe, G. H. and Lee, B. S. 2001b. Two new species of the genus *Pedetontinus* (Archaeognatha, Machilidae) from Korea. *Korean J. Bio. Sci.*, 5: 179-185.
- Mendes, L. F. 1990a. On a new species of *Pedetontinus* Silvestri, 1943 (Microcoryphia, Machilidae) from Northern Korea. *Garcia de Orta, S. é. Zool.*, 17: 53-58.
- Mendes, L. F. 1990b. An annotated list of generic and species names of Machilidae (Microcoryphia, Insecta) with identification keys for the genera and geographical notes. *Bst. Ers. Docum.*, 155: 1-127.
- Silvestri, F. 1943. Contributo alla conoscenza dei Machilidae (Insecta, Thysanura) del Giappone. *Boll. Lab. Zool. Gen. Agr. Portici.*, 32: 283-306.
- Xue, L-Z and Yin, W-Y 1991. Two new species of Machilidae from the Tianmu Mountain, China (Microcoryphia). *Contr. Shanghai Inst. Entomol.*, 10: 77-86. [薛鲁征, 尹文英, 1991. 天目山石蛎二新种 (石蛎目, 石蛎科). *昆虫学研究集刊*, 10: 77-86]
- Zhang, J-Y, Song, D-X and Zhou, K-Y 2005. A new species of the genus *Pedetontinus* (Microcoryphia, Machilidae) from China. *Acta Zootaxonomica Sinica*, 30: 549-554. [张加勇, 宋大祥, 周开亚, 2005. 中国跃蚧属一新种 (石蛎目, 石蛎科). *动物分类学报*, 30: 549 ~ 554]

斑; 第 腹节肢基片长/宽为 2/3; 而 *P. lineatus* 体长 8 ~ 9 cm, 体色灰色, 体表具黑色鳞片; 复眼红棕色, 复眼无色斑; 第 腹节肢基片长/宽为 1/2。与天目跃蚧 *P. tianmuensis* Xue & Yin 在体长、复眼色斑、阳基侧突上明显区别, 天目跃蚧体长 8 ~ 10 cm, 复眼中缘具白斑, 阳基侧突为 1 + 6 型。

正模 福建太姥山, 海拔 780 m, 2008-08-25, 张加勇采, 编号 ZNUSB001。

词源: 新种以我国著名蛛形学家宋大祥院士姓氏命名。